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Does Financial Structure Matter for Poverty?

Evidence from Developing Countries

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Abstract

Although there has been research looking at the relationship between the structure of the financial system and economic growth, much less work has dealt with the importance of bank-based versus market-based financial systems for poverty and income distribution. Empirical evidence has indicated that the structure of the financial system has little relevance for economic growth, suggesting that the same could be true for poverty since growth is an important driver in reducing poverty. Some theories, however, claim that, by reducing information and transaction costs, the development of bank-based financial systems could exert a particularly large impact on the poor. This paper looks at a sample of 47 developing economies from 1984 through 2008. The results suggest that when institutions are weak, bank-based financial systems are better at reducing poverty and, as institutions develop, market-based financial systems can turn out to be beneficial for the poor.

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Does Financial Structure Matter for Poverty? Evidence from Developing Countries[1]

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I. INTRODUCTION

While financial development and its effects on economic growth have attracted considerable attention in the literature, far less work has been done on the relationship between financial deepening and poverty. More particularly, few studies have looked into the possible importance of the structure of the financial system, i.e. whether financial intermediation is performed through banks or markets, for poverty reduction. Yet, lack of access to finance has been argued to be one of the main factors behind persistent poverty.

Furthermore, financial development is a complex process involving a number of intermediaries. Recent empirical studies have argued that, while necessary, financial liberalization may not be sufficient to foster an environment where the financial sector could function effectively. The strength of the legal environement, institutional reforms related to property rights and creditor information are crucial. Yet, the most common measure for financial development—private credit—does not directly capture these dimensions.

This paper aims to contribute to the literature in several ways. First, it tries to capture the role of the structure of the financial system in reducing poverty. Second, it examines in particular the role of the quality of institutions in shaping the link between financial structure and poverty. Third, it looks specifically at developing countries, reaching more conclusive results on the role of the bank- versus market-based systems than studies with global coverage.

The results suggest that the structure of the financial system does play an important role in reducing poverty in developing countries. Financial deepening achieved through the expansion of banks contributes to poverty reduction, implying that more bank-based financial systems tend to do better in lifting people out of poverty. But as institutions grow stronger, market-based financial systems can turn to be beneficial to the poor.

In what follows, Section II reviews the literature; Section III discusses the data, describes the methodology, and presents the results; and Section IV draws some conclusions.

II. THEORETICAL BACKGROUND AND REVIEW OF THE LITERATURE

A. Finance and poverty

Financial development could help the poor through several channels. First, it has been argued that lack of access to finance is one of the main factors behind persistent poverty (Levine, 2008). Because of the high unit costs of small-scale lending and other imperfections, the poor cannot borrow against future earnings to invest.

The provision of improved financial services could also make it easier for entrepreneurs and household to manage risks and, thereby, expand their economic opportunities (Stiglitz, 1974; Newberry, 1977; Atkinson and Stiglitz, 1980; Townsend, 1982; and Bardhan et al., 2000). A drop in the fixed cost of managing risk would disproportionately benefit poor households.

Finally, financial development could affect the economic opportunities and outcomes of households without directly influencing their use of financial services (Beck et al., 2009;

Gine and Townsend, 2004; and Townsend and Ueda, 2006). For example, financial development by enhancing economic activity could boost the demand for labor. If this increased labor demand falls primarily on low-skilled workers, this indirect effect of financial development could increase the income of the poor and reduce income inequality. Thus, even if financial development does not increase the direct use of financial services by the poor, it might alleviate poverty and tighten the income distribution by creating job opportunities for the poor.

Similarly, financial development could intensify the competition in the non-financial sector by reducing the barriers to the entry of new firms. According to Becker (1957), this increased competition could reduce discrimination in hiring workers and expand the economic opportunities of disadvantaged groups, i.e. the poor.

Empirically, many studies looking at micro data find evidence of a positive correlation between access to finance and poverty. Jacoby (1994), for instance, finds that lack of access to credit perpetuates poverty in Peru because poor households cannot afford to provide their children with appropriate education. Jacoby and Skoufias (1997) show that households from Indian villages without access to credit markets tend to reduce their children's schooling when transitory shocks reduce their income. Similarly, Dehejia and Gatti (2003) and Beegle et al. (2003) show that child labor rates are higher in countries with poorly functioning financial systems.

Rosenzweig and Wolpin (1993) and Rosenzweig and Binswanger (1993) find evidence to support the risk diversification view. Their results suggest that low-wealth households without access to services that would help to manage their risks choose lower-return, lower-risk activities compared to households without these constraints.

Turning to the job creation channel, Burgess and Pande (2005) look at India's policy on bank branches that led to the opening of thousands of new rural bank branches in states with initially low levels of financial development. Their results suggest that opening a bank branch led to faster growth in wages of agricultural workers, while the wages of urban factory workers did not show the same time pattern.

Beck et al. (2009) examine the effects of the deregulation of geographic restrictions on banking across individual states of the United States. They find that deregulation exerts a disproportionately positive increase in the demand for lower-skilled workers, which increases their annual earnings relative to higher-income individuals and, hence, narrows income disparities.

Levine et al. (2009) study the same event to assess whether racial discrimination fell after states deregulated in the United States. They find that the difference between the wage rates of white males and black males narrowed after bank deregulation. Financial development seems to have broadened the economic opportunities of a group that had been discriminated against.

Work using macro data are, however, less conclusive on a possible association between poverty and access to finance or job opportunities. Beck et al. (2007), Honohan (2004), Jalilian and Kirkpatrick (2002), and Singh and Huang (2011) find that the degree of financial intermediation has a strong positive impact on the income of the poor. Jalilian and Kirkpatrick (2002) use the ratio of bank assets to GDP to measure financial intermediation in a sample of advanced and developing economies. Beck et al. (2007) and Honohan (2004), looking only at developing countries, capture the role of finance by considering private sector credit. Singh and Huang (2011) also use private sector credit, but with a sample covering only Sub-Saharan African countries.

In contrast, Dollar and Kraay (2002) find that financial development does not affect the poor. They examine the relationship between the average income of the poorest quintile in a sample of advanced and developing economies, and measure financial depth using the ratio of commercial bank assets to total bank assets. Kraay (2004) reaches similar results studying the association between the change in absolute poverty and the ratio of M2 to GDP in a sample of developing countries.

Finally, Guillaumont-Jeanneney and Kpodar (2011) suggest that the poor benefit primarily from the ability of the banking system to facilitate transactions and provide savings opportunities rather than reaping the benefit of greater access to credit. Looking at a sample of developing countries, they find a positive relationship between financial development and poverty if financial development is measured by the ratio of M3 to GDP. If private credit is used instead, the association turns out to be statistically insignificant.

B. Banks, markets and the institutional environment

Financial institutions operate in settings where complete information is often not available. Entrepreneurs seeking financing normally have more information about their projects than their banks do. In this setting, from the viewpoint of a financial institution projects that may have different probabilities of success are indistinguishable. This information asymmetry requires banks to screen applications so as to grant loans only to the most promising projects (Singh, 1992).

The lender cannot rely simply on increasing the interest rate, however. As Stiglitz and Weiss (1981) demonstrated, increases in the interest rate charged on loans may adversely affect the composition of the pool of borrowers. The expected return to the lender depends on the probability of repayment, so the lender would like to be able to identify borrowers who are more likely to repay. Those who are willing to borrow at high interest rates, however, may be riskier: they are willing to borrow at high interest rates because they perceive their probability of repaying the loan to be low. For a given expected return, an increase in interest rates will induce low-risk projects to drop out first, leaving only the riskier ones in the pool.

Lenders could require collateral, which imposes a cost if the entrepreneur defaults. As the probability of failure is greater for high-risk projects, the same amount of collateral will reduce the expected profit of these projects by more than that of less risky ones. Bester (1985) demonstrated that lenders could design attractive contracts adapted to the various qualities of borrowers, leading to perfect sorting.

In this setting, the poor, who have no formal collateral, or small enterprises that would be more likely to recruit the poor, would find it difficult to reap the benefits of a larger financial sector. Financial development would thus favor the rich and increase income inequality if not accompanied by reforms to deal with information problems (Banerjee and Newman, 1993; Galor and Zeira, 1993; Piketty, 1997).

Alternatively, loan providers could invest in gathering additional information on projects that would lead to a better perception of the probability of success for a given project (Devinney, 1986; Singh, 1994, 1997). In this regard, a number of authors have argued that banks would be better placed than markets in alleviating these informational problems. For instance, Diamond (1984), Boot and Thakor (1997), Boyd and Prescott (1986), and Ramakrishnan and Thakor (1984) stress the critical role banks play in easing information asymmetries and thereby improving resource allocation. Furthermore, banks frequently establish close, long-term relations with firms and ease cash-flow constraints on existing firm expansion with positive ramifications on economic growth (Hoshi et al., 1991). By contrast, markets have been argued not to produce the same improvements (Bhide, 1993; Stiglitz, 1985). Stiglitz (1985), for instance, argues that well-developed markets quickly and publicly reveal information, which reduces the incentives for individual investors to acquire information.

The importance of a market-based versus bank-based financial system may depend on existing institutions. According to this view, economies will benefit from becoming more market-based only as their institutional framework strengthens (Levine, 2002). Gerschenkron (1962), Boyd and Smith (1998), and Rajan and Zingales (1999) stress that banks can more effectively force firms to honor their contracts than atomistic markets and would thus be especially important in countries at early stages of development and with weak contract enforcement capabilities.

As institutions in countries mature, the exchange of information becomes more efficient, reducing the cost of screening borrowers. In advanced countries, databases centralizing information on borrowers are often established by the private sector or maintained by central banks. These registries collect information on the standing of borrowers in the financial system and make it available to lenders. The system improves transparency, rewarding good borrowers and increasing the cost of default. Detragiache et al. (2005), Djankov et al. (2005), McDonald and Schumacher (2007), and Singh et al. (2009) all show that information-sharing is associated with greater financial development.

The law and finance literature has stressed the importance of legal institutions (especially those protecting private property rights) in explaining international differences in financial development. Where legal systems enforce private property rights, support private contracts, and protect the legal rights of investors, lenders tend to be more willing to finance firms —in other words, stronger creditor rights tend to promote financial development (see Acemoglu and Johnson, 2005, Cottarelli et al., 2003, Dehesa et al., 2007, McDonald and Schumacher, 2007, Singh et al., 2009, and Tressel and Detragiache, 2008).

Hence, theoretically, given a certain level of institutional development, banks may have an advantage in dealing with information asymmetries compared to markets. If this is true, a bank-based financial system would be able to either provide better access to credit to poor

households, offer them cheaper financial instruments to manage their risk, or finance the expansion of more firms that would be using their skills. The more a financial structure would be bank-oriented the narrower income inequalities and the lower poverty would be.

Empirically, most studies looking at the structure of the financial system tend to suggest, however, that it is irrelevant. Beck and Levine (2004), Levine and Zevros (1998), and Rousseau and Wachtel (2000) use indices of stock market development and bank credit to the private sector to measure the finance-growth link. They show that that both banking sector and stock market developments positively influence economic growth. Looking at firm level data, Beck and Levine (2002) and Levine (2002) come to the conclusion that financial structure per se does not importantly explain industrial performance or the creation of new firms.

Arestis, Demetriades, and Luintel (2000), nevertheless, suggest that banks could play a more important role. Using quarterly data and applying time series methods to five developed economies, they show that, while both banking sector and stock market development explain subsequent growth, the effects of banking sector development is substantially larger than that of stock market development. Honohan (2004) shows that bank credit reduces poverty while market indicators (capitalization and turnover) do not seem to have any significant effect.

III. EMPIRICAL ANALYSIS

A. Sample

We compiled data for a sample of 47 developing economies over the period 1984-2008. Developing countries are defined as countries classified by the World Bank as low- or middle-income countries. Excluding developed countries from the sample reduces sample heterogeneity. The sample size and the period of study are limited by the availability of data on poverty and stock market indicators. To smooth short-term fluctuations of macroeconomic variables and take into account the fact that yearly poverty indicators may not be available for many countries, we averaged the data over a 5-year period, which gives us up to five data points per country.

B. Econometric specification and definition of variables

The model

To assess the impact of the financial structure, we adopted a standard poverty model building on previous studies (see for instance Dollar and Kraay, 2002: Honohan, 2004: Guillaumont and Kpodar, 2011; and Singh and Huang, 2011). The model explains poverty by a core set of control variables including income per capita, inflation, trade openness and infrastructure. The baseline model is then augmented with the financial structure and financial development variables.

The baseline model is as follows:

$$P_{i,t} = \alpha_0 + \alpha_1 y_{i,t} + \beta X_{i,t} + \vartheta FD_{i,t} + \theta FS_{i,t} + u_i + \epsilon_{i,t} \quad (1)$$

where $P_{i,t}$ is the indicator of poverty for a country *i* at a period *t*; $y_{i,t}$ represents the level of income per capita; $X_{i,t}$ is a set of control variables excluding income per capita; $FD_{i,t}$ and $FS_{i,t}$ are the sets of variables of interest accounting respectively for financial development and financial structure; u_i is the country specific effect and $\epsilon_{i,t}$ is the error term.

To test the importance of the quality of institutions, we adopted the following specification:

$$P_{i,t} = \alpha_0 + \alpha_1 y_{i,t} + \beta X_{i,t} + \vartheta FD_{i,t} + \theta FS_{i,t} + \rho Law_{i,t} + \varphi FS_{i,t} Law_{i,t} + u_i + \epsilon_{i,t} \quad (2)$$

where $Law_{i,t}$ represents the institutional variable. The definition of the other variables remains the same as in the first model.

The variables

Poverty. Poverty is complex. It has many faces, often changing from place to place and across time. Though it is usually defined as having insufficient resources or income, in its extreme form poverty is a lack of basic human needs, such as adequate food, clothing, housing, clean water, or health services. It is also a lack of education or opportunity, and may be associated with insecurity and fears for the future, lack of representation and freedom.

The literature, which has generally focused on the economic aspect of poverty, mainly uses four related indicators of poverty: the headcount index and the poverty gap to measure absolute poverty; the Gini coefficient and the average income of the poorest quintile to measure relative poverty. This paper adopts the same approach.

Several attempts have been made, however, to come up with an index of multidimensional poverty which captures access to education and health, access to basic needs such as electricity and clean water, and more importantly household assets and quality of institution (see for example Alkire and Santos, 2010). Aside from the common criticism on the choice of weights for such index, the sub-components of an index of multidimensional poverty and the index itself tend to be highly correlated with household income.[2] This would suggest that income-based poverty measures could indirectly capture to a large extent the many faces poverty has.

[2] Alkire and Santos (2010) find a correlation coefficient of 0.85 between their multidimensional poverty index and headcount poverty. An index of multidimensional poverty also poses a challenge for empirical models because its components are often variables that have been used on the right-side of equations explaining poverty.

The *headcount index* measures the percentage of the population living with per capita consumption or income below the poverty line, defined as US$1.25 a day. This is the most popular measure of poverty because, though arbitrary, it provides a quantifiable metric of people living in what a society at one point in time considers unacceptable conditions.

The *poverty gap* takes into account the distance of the poor from the poverty line. This measure characterizes how far below the poverty line lies the average income of the poor and provides some sense of distribution. Unlike the headcount index, this indicator captures a decrease or increase in the income of the poor even when it does not cross the poverty line.

The *Gini coefficient*, the measure most commonly used to describe income disparity, offers a comparative measure of poverty. Indicators based on the poverty line tend to describe poverty in absolute terms. Yet studies suggest that an individual's welfare depends not only on absolute income but also on how his or her income compares with that of the rest of the population. Everyone could be above the poverty line, but the income distribution might be very skewed. The Gini coefficient is derived from the Lorenz curve, with larger values indicating greater income inequality.

The *income of the poorest quintile* is defined as the average per capita income of the poorest 20 percent of the population.

Financial Structure. In line with Levine (2002), we adopt indicators of financial structure measuring the relative importance of stock markets with respect to banks (see also Luintel et al., 2008; and Andrianaivo, 2010). The literature typically distinguishes three dimensions of financial structure: size, activity, and efficiency. Financial structure size (structure-size henceforth) is the ratio of the size of stock markets, captured by stock market capitalization, to the size of the banking system. As the latter can be measured by three different indicators, namely the volume of credit granted by commercial banks to the private sector, the total value of bank assets, and the total value of banks deposits, we can derive three indicators of structure-size as follows:

$$size1 = \frac{stock\ market\ capitalization}{private\ credit} \tag{3}$$

$$size2 = \frac{stock\ market\ capitalization}{bank\ assets} \tag{4}$$

$$size3 = \frac{stock\ market\ capitalization}{bank\ deposits} \tag{5}$$

Financial structure activity (structure-activity henceforth) measures stock market activity compare to banking sector activity. While stock market activity is captured by the value of domestic equities traded on domestic exchanges, activity of financial intermediaries appears to be better measured by credit to the private sector, which has the advantage of being a good measure of both size and activity of banks. Another indicator of banking activity that could be considered is the loan-to-deposit ratio, though it is affected by prudential requirements.

Indeed, a high loan-to-deposit ratio is not necessarily desirable as the banks might not have sufficient liquidity to meet the demand for withdrawals. Based on these indicators of activity of stock markets and banks, we therefore measure structure-activity as follows:

$$act1 = \frac{stock\ market\ total\ value\ traded}{private\ credit} \quad (6)$$

$$act2 = \frac{\left(\frac{stock\ market\ total\ value\ traded}{GDP}\right)}{\left(\frac{bank\ loans}{bank\ deposits}\right)} \quad (7)$$

The last dimension is the efficiency of the financial structure (structure-efficiency henceforth) which compares stock market efficiency to that of banks. Following Demirguc-Kunt and Levine (1999), stock market efficiency is measured by stock market total value traded to GDP, while bank overhead cost and net interest margin are used to gauge the efficiency of the banking sector. We then obtain the two following indicators of structure-efficiency:[3]

$$eff1 = (stock\ market\ value\ traded\ to\ GDP) * (bank\ overhead\ cost\ to\ assets) \quad (8)$$

$$eff2 = (stock\ market\ value\ traded\ to\ GDP) * (bank\ net\ interest\ margin) \quad (9)$$

Higher values of structure-size, structure-activity and structure-efficiency indicate a more market-based financial system, while low values of the same indicators reflect a more bank-based financial system. The importance of using several indicators of financial structure lies in the fact that they represent various dimensions of a complex concept. As pointed out by Levine (2002) and Luintel et al. (2008), stock markets could be sizeable because of the large number of listings, but may have very little activity. Similarly, large banking systems may not be necessarily more efficient if high banking concentration hampers competition.

To achieve a manageable number of variables in some of the regressions, aggregate measures for the financial structure are, however, needed. To this end, we followed the literature by constructing four aggregate measures of financial structure using the principal component factor method:

$$composite\ indicator\ of\ structure - size\ (ss) = pcf(size1, size2, size3) \quad (10)$$

$$composite\ indicator\ of\ structure - activity\ (sa) = pcf(act1, act2) \quad (11)$$

$$composite\ indicator\ of\ structure - efficiency\ (se) = pcf(eff1, eff2) \quad (12)$$

$$overall\ measure\ of\ financial\ structure = pcf(ss, sa, se) \quad (13)$$

[3] Note that overhead cost and net interest margin are in fact measures of banking inefficiency, and therefore the inverse ratio could be considered as measure of bank efficiency. The ratio of stock market efficiency relative to banking sector efficiency is given by the following formula: $eff1 = \frac{(stock\ market\ total\ value\ traded)}{\left(\frac{1}{bank\ overhead\ cost}\right)}$.

where *pcf* stands for principal component factor

Financial Development. We include in the model an indicator of both stock market and banking sector development. In line with previous studies, stock market development is measured by the ratio of stock market capitalization to GDP. Following Guillaumont and Kpodar (2011), we use the ratio of liquid liabilities to GDP to capture banking sector development. We recognize, however, that this type of measure captures only the contribution of the formal financial sector, leaving out the potentially important role of the informal one, including microfinance. There are two reasons for this: (i) although the informal sector may represent a large number of institutions and loans, in the aggregate the credit it offers is usually dwarfed by that of formal financial institutions; (ii) when informal financial arrangements become economically substantive, they tend to be integrated into the formal sector.

Institutions. Recently, indicators of institutional quality and governance have flourished, but many of them suffer from limited country and time coverage. Here, we opt for the widely used indicator of Law and Order—also called Rule of Law—compiled by International Country Risk Guide (ICRG), which assesses the strength and impartiality of the legal system, and the popular observance of the law. This indicator ranges from 0 to 6, with a higher figure indicating a better quality and enforcement of the legal system (Laeven, 2002).

Control Variables. In the baseline model, we include a core set of control variables that are commonly used as factors explaining poverty: overall income per capita, to capture the contribution of economic development (*GDP per capita*); growth of the consumer price index, to control for the macroeconomic environment (*inflation*); the length of the total road network to the country's land area, to measure the quality of infrastructure and access to markets or services such as health and education (*infrastructure*); and the sum of exports and imports as a share of GDP, to capture the degree of international openness (*trade openness*).[4]

C. Methodology

To estimate the model, we use the System Generalized Method-of-Moment (GMM) estimator developed by Blundell and Bond (1998). The estimator combines two sets of equations. The first set includes first-differenced equations where the right-hand-side variables are instrumented by the levels of the series lagged one period or more. The second set consists of the equations in levels with the right-hand side variables being instrumented by lagged first of higher-order differences.

[4] Income per capita is expected to be negatively correlated with poverty incidence. In contrast, inflation is thought to be harmful to the poor as it may reduce the real value of wages and transfers (see for instance Easterly and Fischer, 2001). Well-developed infrastructure, measured by road density, is expected to be negatively correlated with poverty incidence. Finally, the impact of trade openness on poverty may be mixed. While high openness to trade can facilitate access to larger markets for the agricultural sector, in which the poor are often concentrated, trade liberalization involves distribution changes, which may not be always beneficial for the poor, at least in the short-run (Winters et al., 2004). Data sources are provided in Appendix 3.

This estimator has several advantages that the finance and growth literature has pointed out.[5] It takes into account country-specific effects, while allowing addressing issues associated with endogeneity, measurement errors, and omitted variables. By exploiting internal instruments, the System GMM estimator removes the often hard task of identifying valid external instruments consisting of variables that are correlated with the endogenous explanatory variable but not with the error term of the equation.

The validity of these internal instruments (lagged variables in level and first differences) was not rejected. As suggested by Arellano and Bond (1991), and Blundell and Bond (1998), a Sargan/Hansen test of over-identifying restrictions and a serial correlation test were carried out. In both instances, the null hypothesis could not be rejected (the instrumental variables are not correlated with the residual, and the errors exhibit no second-order serial correlation).

In addition, to limit the risk of over-instrumentation, we keep the number of instruments to the minimum by using as instrument only the first valid lagged value of the right-hand side variables. We assume that financial variables are endogenous, therefore are instrumented by their second lag value, while the other variables, treated as predetermined, are instrumented by their first lag value.

D. Results

Results for the estimations of equation (1) are presented in Table 1. Looking first at the level of financial sector development, the results would suggest that countries with deeper banking sector tend to have lower poverty rates; the coefficient on banking development is negative and significant in all regressions,[6] By contrast, stock market development appears to have no impact on poverty levels.

Turning to the importance of the financial structure, a positive and significant coefficient of financial structure indicators would suggest that countries with bank-based financial systems tend to have lower levels of poverty than those with market-based financial systems. According to the size variable, this observation seems to be true: in 2 out of 3 specifications, the coefficient on the structure-size variable turns out positive and significant (columns 1 to 3, Table1). Measures of the financial activity and efficiency do not seem, however, to affect poverty levels. Hence, relatively more vibrant banking systems in term of credit, and assets would be more conducive to lower levels of poverty. In contrast, relatively more dynamic stock markets with high turnover do not seem to make a difference (activity variable), even when relatively high banking costs are factored in (efficiency variable).

The results related to the control variables are mostly in line with expectations. There is a strong negative relationship between income per capita and poverty incidence, suggesting

[5] Bond, Hoeffler and Temple (2001) offer a good overview on GMM estimation of empirical growth models.

[6] The conclusion remains the same when private credit is used to measure banking sector development.

that higher levels of economic development are associated with lower levels of poverty. There is an evidence of a threshold effect between inflation and poverty incidence: low and moderate inflation rates in the range of 1-2 percent are not detrimental to the poor; above this threshold the negative impact of inflation on the poor starts to materialize.[7] Trade openness and infrastructure development are not robustly linked to poverty, probably because any association between these two variables and poverty may be passing through economic development, which is already captured by our income per capita variable.

We study next the influence of institutions. Results are presented in Table 2. To achieve a manageable number of regressions, we use the composite measures of structure-size, structure-activity and structure-efficiency as defined above. Using these composite measures confirm the previous results, namely that large stock markets relative to banks may not favor the poor, while active and efficient stock markets relative to banks seem not have any influence (columns 1 to 3, Table 2). The overall measure of financial structure, aggregating structure-size, structure-activity and structure-efficiency, does not appear with a significant coefficient, suggesting that overall the structure of the financial system may be irrelevant for poverty (column 4, Table 2).

Introducing the quality of institutions in our model sheds more light on the complexity of the relationship between financial structure and poverty. Both the level of the quality of institutions and its interaction with the financial structure are examined. The results show first of all that strong institutions are associated with lower levels of poverty, as suggested by the negative and significant coefficient on the institutional variable (column 5 to 8, Table 2).

In addition, the results indicate that the relationship between the financial structure and poverty may hinge on a country's institutional development. The coefficients on activity and size become significant and positive, as well as that on the overall measure of the financial structure (columns 5 to 8, Table 2), suggesting that the statistical insignificance of the results in previous regressions actually reflected country heterogeneity with regard to institutional development. This would imply that overall given a certain institutional environment bank-based financial systems tend to be associated with lower levels of poverty than market-based financial systems.

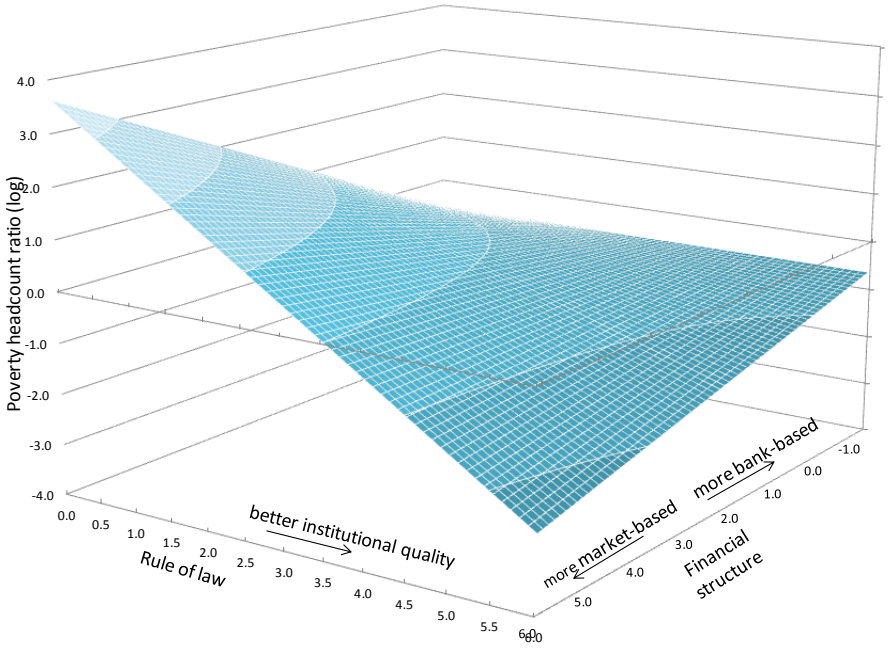
The coefficients on the interaction terms with the financial variables all come out negative and significant. These results suggest that the negative association between a market-based financial system and poverty could diminish as institutions grow stronger and even reverse. These observations are consistent with the views that bank-based systems are more appropriate in countries with weak shareholder protection and property right enforcement, while economies benefit from more market-based systems when legal systems improve.

The threshold for institutional development beyond which market-based systems could be more favorable to the poor is estimated to be in the range of 3.8-4.2 depending on the

[7] When inflation is introduced without its square value, the sign of the coefficient is counterintuitive, which may be an indication of the presence of a non-linear relationship.

indicator of financial structure used, which is the level of India, Argentina, Uganda, or Turkey for instance (countries are ranked from 0 to 6, see Annex 1 for the list of countries and their average Rule of Law index during 1984-2008). Figure 1 illustrates the relationship between financial structure, institutional quality and poverty as implied by the specification in column 8 of Table 2. It clearly shows that poverty levels would be high in countries with both weak institutional quality and market-based financial systems, while poverty levels would fall with improving institutional quality in market-based financial systems.

Figure 1. Poverty Headcount Ratio as a Function of Financial Structure and Institutional Quality (regression column 8, Table 2)



Robustness tests and use of other indicators of absolute and relative poverty

To test for the robustness of the results: [8]

- We added control variables that might affect poverty levels such as education level (measured by either primary or secondary school enrolment rate), level of remittances and government expenditures, both as a share of GDP. The results remained unchanged.

- In addition, our findings remain unchanged when controlling for the level of lagged poverty headcount ratio, and when introducing GDP per capita as an interaction variable with the financial structure.[9]

[8] The results not shown in the paper are available upon request.

- We removed outliers without altering the previous conclusions.[10]

- Finally, we used alternative measures of absolute and relative poverty. The results using the poverty gap confirmed the observations for the poverty headcount ratio, while the financial structure does not matter much for relative poverty measured by either the average income of the poorest quintile or the Gini coefficient. This may suggest that the impact of financial structure on poverty is mainly felt by households close to the poverty line.

IV. CONCLUSION

This paper examines the link between financial structure and poverty in a sample of developing economies over the period 1984 to 2008. It pays particular attention to the role of institutions and their interaction with the structure of the financial system. The results suggest that overall a more bank-based financial system is associated with lower levels of poverty. They also indicate that the contribution of more market-based systems increases with institutions growing stronger. In this regard, the results are consistent with the views that banks play an important role at earlier stages of economic development, when institutions are still weak, particularly those related to property rights.

Accounting for the quality of institutions helps better understand the complexity of the relationship between financial structure and poverty. It stresses the importance to carry out institutional reforms such as stronger property rights as the financial sector develops. Only if these reforms take place, can a move to a more market-based financial system benefit a country's population at large and the poor in particular.

[9] This probably reflects the fact that countries with stronger institutions tend to have higher income levels.

[10] Using the specification in column 8 of Table 2, outliers are defined as all country observations for which the residual is larger than two standard deviations of the dependant variable.

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Table 1. Financial Structure and Poverty Incidence

Log of Poverty Headcount	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GDP per capita (log)	-1.087	-1.088	-1.082	-1.136	-1.111	-1.190	-1.191
	[0.135]***	[0.133]***	[0.137]***	[0.108]***	[0.120]***	[0.129]***	[0.128]***
Inflation (log)	-2.903	-2.844	-3.343	-2.786	-2.800	-2.753	-2.887
	[0.770]***	[0.711]***	[0.730]***	[0.720]***	[0.704]***	[0.691]***	[0.660]***
Inflation squared (log)	1.893	1.856	2.090	1.729	1.731	1.707	1.782
	[0.464]***	[0.431]***	[0.440]***	[0.449]***	[0.437]***	[0.426]***	[0.412]***
Trade openness	0.003	0.003	0.003	0.000	0.001	0.001	0.001
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]
Road/area	-0.002	-0.003	-0.003	-0.004	-0.003	-0.004	-0.005
	[0.002]	[0.002]	[0.003]	[0.002]*	[0.002]	[0.003]	[0.003]
Stock market development	-0.240	-0.283	0.243	0.656	0.597	0.545	0.558
	[0.551]	[0.533]	[0.569]	[0.369]*	[0.442]	[0.365]	[0.396]
Banking sector development	-1.970	-2.084	-2.615	-2.345	-2.615	-2.374	-2.457
	[0.733]***	[0.670]***	[0.688]***	[0.654]***	[0.618]***	[0.655]***	[0.619]***
Structure-size 1	0.441						
	[0.220]**						
Structure-size 2		0.578					
		[0.321]*					
Structure-size 3			0.150				
			[0.288]				
Structure-activity 1				0.082			
				[0.137]			
Structure-activity 2					0.216		
					[0.413]		
Structure-efficiency 1						7.028	
						[9.476]	
Structure-efficiency 2							4.789
							[8.810]
Constant	11.861	11.951	12.327	12.838	12.680	13.258	13.332
	[1.125]***	[1.093]***	[1.091]***	[0.931]***	[1.016]***	[1.091]***	[1.066]***
Observations	121	121	121	118	118	111	111
Number of countries	47	47	47	45	45	43	43
Sargan/Hansen test	0.69	0.69	0.65	0.75	0.71	0.84	0.83
AR2	0.13	0.09	0.15	0.30	0.55	0.22	0.25

The result are obtained using the one-step System GMM estimator; Robust standard errors in brackets.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 2. Financial Structure and Poverty Incidence: Accounting for Institutional Development

Log of Poverty Headcount	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP per capita (log)	-1.079	-1.253	-1.333	-1.347	-0.873	-0.990	-1.050	-1.054
	[0.135]***	[0.116]***	[0.137]***	[0.139]***	[0.132]***	[0.121]***	[0.122]***	[0.123]***
Inflation (log)	-2.924	-2.430	-2.523	-2.583	-2.172	-2.237	-1.967	-2.135
	[0.744]***	[0.678]***	[0.672]***	[0.676]***	[0.679]***	[0.769]***	[0.696]***	[0.713]***
Inflation squared (log)	1.905	1.500	1.570	1.616	1.313	1.369	1.171	1.291
	[0.443]***	[0.434]***	[0.425]***	[0.424]***	[0.418]***	[0.492]***	[0.432]***	[0.444]***
Trade openness	0.004	-0.004	-0.002	-0.002	0.001	0.000	0.001	0.002
	[0.003]	[0.003]	[0.003]	[0.004]	[0.003]	[0.003]	[0.004]	[0.004]
Road/area	-0.003	-0.004	-0.005	-0.005	-0.004	-0.003	-0.003	-0.003
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.002]	[0.003]	[0.003]
Stock market development	-0.401	0.616	0.567	0.523	0.682	0.366	0.524	0.449
	[0.574]	[0.384]	[0.397]	[0.421]	[0.419]	[0.351]	[0.301]*	[0.323]
Banking sector development	-2.039	-1.817	-1.966	-1.987	-1.912	-1.898	-2.021	-2.072
	[0.720]***	[0.740]**	[0.737]***	[0.743]***	[0.632]***	[0.587]***	[0.578]***	[0.575]***
Composite indicator of structure-size	0.373				0.371			
	[0.209]*				[0.239]			
Composite indicator of structure-activity		0.036				0.589		
		[0.070]				[0.261]**		
Composite indicator of structure-efficiency			0.062				0.523	
			[0.079]				[0.220]**	
Overall measure of financial structure				0.095				0.599
				[0.094]				[0.231]***
Institutions - Law and order (ICRG)					-0.237	-0.199	-0.141	-0.150
					[0.072]***	[0.068]***	[0.078]*	[0.078]*
Composite indicator of structure-size*Institutions					-0.147			
					[0.071]**			
Composite indicator of structure-activity*Institutions						-0.139		
						[0.065]**		
Composite indicator of structure-efficiency*Institutions							-0.136	
							[0.050]***	
Overall measure of financial structure*Institutions								-0.146
								[0.052]***
Constant	12.203	13.775	14.447	14.584	11.123	12.050	12.269	12.394
	[1.081]***	[0.998]***	[1.167]***	[1.198]***	[1.068]***	[0.990]***	[1.030]***	[1.021]***
Observations	121	118	111	111	116	114	107	107
Number of countries	47	45	43	43	44	43	41	41
Sargan/Hansen test	0.78	0.58	0.62	0.64	0.78	0.90	0.68	0.71
AR2	0.07	0.26	0.27	0.31	0.72	0.48	0.35	0.29

The result are obtained using the one-step System GMM estimator; Robust standard errors in brackets.
* significant at 10%; ** significant at 5%; *** significant at 1%

Annex 1. Average Rule of Law Index (1984-2008)

Countries	Average Rule of Law Index (1984-2008)
Colombia	1.4
Brazil	2.3
Nigeria	2.3
Guatemala	2.3
Sri Lanka	2.4
South Africa	2.4
Bangladesh	2.5
Uruguay	2.5
Jamaica	2.6
Pakistan	2.7
Mexico	2.7
Panama	2.7
Honduras	2.7
Ghana	2.8
Philippines	2.8
El Salvador	2.9
Indonesia	2.9
Bolivia	2.9
Côte d'Ivoire	3.0
Kenya	3.0
Peru	3.0
Ecuador	3.2
Paraguay	3.3
Egypt, Arab Rep.	3.5
Russian Federation	3.6
Venezuela, RB	3.6
Argentina	3.8
Iran, Islamic Rep.	3.8
Zambia	3.9
Jordan	3.9
Costa Rica	4.0
India	4.0
Mongolia	4.0
Uganda	4.0
Vietnam	4.0
Malaysia	4.0
Thailand	4.1
Tunisia	4.2
Turkey	4.2
Romania	4.3
Botswana	4.5
Morocco	4.6
Poland	4.6
Tanzania	5.0

Notes: Countries at or above the threshold are shaded in gray.

Appendix 1. Summary Statistics and Correlation Matrix

Variable	Observations	Mean	Std. Dev.	Min	Max
Povery incidence	121	18.58	20.18	2.00	88.52
Income of the poorest quintile	120	5.35	2.10	1.47	9.93
Poverty gap	121	6.63	9.00	0.50	47.74
Gini	107	44.09	9.22	27.17	62.00
Stock market capitalization/GDP	121	0.30	0.40	0.01	2.24
Private credit/GDP	121	0.32	0.25	0.04	1.39
Liquid liabilities	121	0.43	0.26	0.15	1.25
GDP per capita	121	4685.77	3242.74	639.90	15335.97
Inflation	121	19.61	44.81	0.89	433.56
Trade openness	121	72.32	38.49	16.27	208.55
Road/area	121	33.09	40.12	1.84	169.47
Structure-size 1	121	0.92	0.77	0.02	3.63
Structure-size 2	121	0.68	0.59	0.02	2.95
Structure-size 3	121	0.76	0.69	0.01	3.50
Structure-activity 1	118	0.31	0.54	0.00	3.15
Structure-activity 2	118	0.13	0.25	0.00	1.44
Structure-efficiency 1	111	0.00	0.01	0.00	0.04
Structure-efficiency 2	111	0.01	0.01	0.00	0.05

Variables		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Povery incidence	(1)	1																	
Income of the poorest quintile	(2)	0.08	1																
Poverty gap	(3)	0.94	-0.06	1															
Gini	(4)	-0.09	-0.91	0.01	1														
Stock market capitalization/GDP	(5)	-0.21	-0.01	-0.22	0.11	1													
Private credit/GDP	(6)	-0.34	-0.04	-0.32	0.08	0.63	1												
Liquid liabilities/GDP	(7)	-0.33	0.23	-0.34	-0.17	0.62	0.84	1											
GDP per capita	(8)	-0.59	-0.21	-0.49	0.17	0.26	0.14	0.02	1										
Inflation	(9)	-0.08	-0.06	-0.06	0.06	-0.12	-0.15	-0.19	0.06	1									
Trade openness	(10)	-0.11	-0.06	-0.02	-0.02	0.32	0.51	0.47	0.04	-0.20	1								
Road/area	(11)	-0.04	0.40	-0.11	-0.39	-0.09	-0.14	-0.09	0.10	0.05	-0.02	1							
Structure-size 1	(12)	-0.02	-0.05	-0.03	0.08	0.62	0.02	0.08	0.26	-0.05	-0.05	-0.07	1						
Structure-size 2	(13)	-0.04	-0.08	-0.04	0.12	0.71	0.13	0.14	0.27	-0.08	0.04	-0.08	0.95	1					
Structure-size 3	(14)	-0.10	-0.15	-0.11	0.22	0.75	0.21	0.12	0.36	-0.05	-0.01	-0.11	0.89	0.93	1				
Structure-activity 1	(15)	-0.13	0.22	-0.19	-0.18	0.38	0.10	0.17	0.23	0.03	-0.11	0.07	0.43	0.36	0.38	1			
Structure-activity 2	(16)	-0.16	0.22	-0.20	-0.18	0.68	0.41	0.49	0.18	-0.05	0.16	0.03	0.43	0.41	0.41	0.86	1		
Structure-efficiency 1	(17)	-0.20	0.04	-0.23	0.04	0.61	0.27	0.25	0.37	0.10	-0.03	-0.01	0.53	0.52	0.59	0.82	0.79	1	
Structure-efficiency 2	(18)	-0.21	0.06	-0.24	0.02	0.63	0.31	0.31	0.32	0.15	0.02	0.01	0.49	0.45	0.50	0.85	0.87	0.94	1

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Appendix 2. List of the Sample Countries

Argentina	Morocco
Bangladesh	Nepal
Bhutan	Nigeria
Bolivia	Pakistan
Botswana	Panama
Brazil	Paraguay
Colombia	Peru
Costa Rica	Philippines
Côte d'Ivoire	Poland
Ecuador	Romania
Egypt, Arab Rep.	Russian Federation
El Salvador	South Africa
Ghana	Sri Lanka
Guatemala	Swaziland
Honduras	Tanzania
India	Thailand
Indonesia	Tunisia
Iran, Islamic Rep.	Turkey
Jamaica	Uganda
Jordan	Uruguay
Kenya	Venezuela, RB
Malaysia	Vietnam
Mexico	Zambia
Mongolia	

Appendix 3. Variable Definitions and Sources

Variables	Definition	Data sources
Poverty incidence	The percentage of the population living below the $1/day international poverty line	World Bank Global Poverty Index Database http://www.worldbank.org/research/povmonitor
Poverty gap	The average shortfall of the poor with respect to the poverty line, multiplied by the headcount ratio	
Log of income of the poorest 20%	Log of average incomes in bottom quintile, constant 1985 USD at PPP	Dollar and Kraay (2002), and World Development Indicators
Gini	The Gini coefficient is the ratio of the area between the Lorenz Curve, which plots share of population against income share received, to the area below the diagonal. It lies between 0 and 1, where 0 is perfect equality and 1 is perfect inequality.	World Income Distribution (Milanovic, 2005, updated in 2010)
GDP per capita	Nominal GDP divided by population size	International Financial Statistics and World Development Indicators
Trade openness	Sum of exports and imports of goods and services as share of GDP	
Inflation rate	Growth of consumer price index	
Road density	The ratio of total road network (km) to country's total area (square km)	
Institutions	Law and Order captures the strength and impartiality of the legal system, and popular observance of the law. Its values range from 0 to 6, with a higher figure indicating a better quality and enforcement of the legal system.	International Country Risk Guide (ICRG)
Private credit/GDP	Private Credit by Deposit Money Banks to GDP	Financial Structure Database 2010
Liquid liabilities/GDP	Currency plus demand and interest-bearing liabilities of banks and other financial intermediaries divided by GDP	
Bank assets/GDP	Claims on domestic real nonfinancial sector by deposit money banks as a share of GDP	
Bank deposits/GDP	Demand, time and saving deposits in deposit money banks as a share of GDP	
Stock market capitalization/GDP	Value of listed shares to GDP	
Stock market value traded/GDP	Total shares traded on the stock market exchange to GDP	
Bank loans to deposits	Total credit by deposit money banks as share of their total deposits	
Overhead costs	Accounting value of a bank's overhead costs as a share of its total assets.	
Net interest margin	Accounting value of bank's net interest revenue as a share of its interest-bearing (total earning)	